

WHAT IS CLAIMED IS:

1. A method for cleaning a translucent tube for a discharge lamp having a luminous bulb portion, comprising the steps of:

5       introducing a cleaning fluid from one end of the translucent tube; and

allowing the cleaning fluid to flow while bringing the cleaning fluid in contact with at least an inner face of the luminous bulb portion of an inner face of the translucent  
10 tube, thereby removing impurities attached on the inner face of the luminous bulb portion.

2. The method for cleaning a translucent tube for a discharge lamp of claim 1, wherein in the step of removing  
15 impurities, the cleaning fluid is allowed to flow while being in contact with an outer face of the translucent tube in the same step, thereby removing impurities attached on the outer face of the translucent tube.

20 3. The method for cleaning a translucent tube for a discharge lamp of claim 1, wherein the step of introducing a cleaning fluid includes the steps of:

disposing the translucent tube in a container for containing a cleaning liquid as the cleaning fluid such that  
25 ends of the tube are positioned in a substantially vertical direction; and

injecting the cleaning liquid into the container, and

the step of removing impurities includes the steps of:

5        lowering the liquid surface of the cleaning liquid  
below a lower portion of the luminous tube portion.

4. The method for cleaning a translucent tube for a discharge lamp of claim 3, wherein the step of elevating the liquid surface of the cleaning liquid and the step of lowering the liquid surface of the cleaning liquid are repeated.

5. The method for cleaning a translucent tube for a  
15 discharge lamp of claim 3, wherein the step of lowering the  
liquid surface of the cleaning liquid is performed such that  
the liquid surface of the cleaning liquid is lowered below a  
lower end of the translucent tube.

20 6. The method for cleaning a translucent tube for a discharge lamp of claim 3, wherein the step of elevating the liquid surface of the cleaning liquid is performed such that the liquid surface of the cleaning liquid is elevated above an upper end of the translucent tube.

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7. The method for cleaning a translucent tube for a discharge lamp of claim 3, further comprising the step of

discharging the cleaning liquid in the container from the container.

8. The method for cleaning a translucent tube for a  
5 discharge lamp of claim 3, wherein an ending point of  
cleaning is determined by monitoring a concentration of the  
impurities contained in the cleaning liquid in the container.

9. The method for cleaning a translucent tube for a  
10 discharge lamp of claim 3, wherein the translucent tube is  
disposed using a holding tool for holding a plurality of  
translucent tubes such that ends of the tubes are positioned  
in a substantially vertical direction.

10. The method for cleaning a translucent tube for a  
15 discharge lamp of claim 3, wherein the cleaning liquid is one  
selected from the group consisting of ultrapure water, pure  
water, deionized water, hydrofluoric acid aqueous solution  
and hydrogen peroxide aqueous solution, and a combination of  
20 one of these cleaning liquids and cleaning fine particles.

11. The method for cleaning a translucent tube for a  
discharge lamp of claim 3, wherein a plurality of kinds of  
impurities are attached on the inner face of the luminous  
25 bulb portion as the impurities, the method comprising at  
least:

a first step of introducing a first cleaning liquid as

the cleaning liquid from the one end of the translucent tube with respect to a first kind of impurities of the plurality of kinds of impurities, and

a second step of introducing a second cleaning liquid  
5 other than the first cleaning liquid as the cleaning liquid  
from the one end of the translucent tube with respect to a  
second kind of impurities other than the first kind of  
impurities of the plurality of kinds of impurities.

10 12. The method for cleaning a translucent tube for a  
discharge lamp of claim 1, wherein the cleaning fluid is  
either one of gas, liquid, or fine particle powder, and

the step of removing impurities attached on the inner face of the luminous bulb portion is performed by discharging the cleaning fluid introduced from one end of the translucent tube for a discharge lamp from the other end of the translucent tube for a discharge lamp.

13. The method for cleaning a translucent tube for a  
20 discharge lamp of claim 12, wherein the cleaning fluid is  
inert gas.

14. An apparatus for cleaning a translucent tube for a discharge lamp comprising:

25           a container for accommodating a translucent tube for a  
discharge lamp having a luminous bulb portion and for  
containing a cleaning liquid;



enclosing a luminous material and including a pair of electrodes opposed to each other therein,

wherein the discharge lamp is produced by a method for producing a discharge lamp comprising the steps of:

5       preparing a translucent tube for a discharge lamp including a luminous bulb portion that becomes a luminous bulb of the discharge lamp, and side tube portions extending from the luminous bulb portion, the translucent tube having been subjected to a cleaning process;

10       inserting an electrode assembly including metal foils and electrodes connected to the metal foils into the side tube portion such that heads of the electrodes are positioned inside the luminous bulb portion; and

15       forming the sealing portions by tightly attaching the metal foils of the electrode assembly to the side tube portions,

the cleaning process comprising the steps of:

20       (a) introducing a cleaning fluid from one end of a translucent tube for a discharge lamp including a luminous bulb portion that becomes a luminous bulb of the discharge lamp, and side tube portions extending from the luminous bulb portion; and

25       (b) allowing the cleaning fluid to flow while bringing the cleaning fluid in contact with at least the inner face of the luminous bulb portion of the inner face of the translucent tube, thereby removing impurities attached on the inner face of the luminous bulb portion,

wherein the step (a) includes a step (a-1) of disposing the translucent tube in a container for containing a cleaning liquid as the cleaning fluid such that ends of the translucent tube are positioned in a substantially vertical direction; and a step (a-2) of injecting the cleaning liquid  
5 into the container, and

the step (b) includes a step (b-1) of elevating a liquid surface of the cleaning liquid above an upper portion of the luminous bulb portion of the translucent tube; and a  
10 step (b-2) of lowering the liquid surface of the cleaning liquid below a lower portion of the luminous tube portion.

18. The discharge lamp of claim 17, wherein

at least mercury as the luminous material, a rare gas  
15 and halogen are enclosed in the luminous bulb, and the luminous bulb is made substantially of quartz glass, and the electrodes are made substantially of tungsten, and

a mole number of the halogen is larger than a sum of a total mole number of metal elements that have a property of  
20 bonding to the halogen and are present in the luminous bulb (except for tungsten and mercury), and a mole number of the tungsten present in the luminous bulb after evaporated from the electrodes during lamp operation.

25 19. The discharge lamp of claim 18, wherein

the mole number of the halogen enclosed in the luminous bulb is not less than five times the total mole number of

sodium (Na), potassium (K), lithium (Li), chromium (Cr), iron (Fe) and nickel (Ni) present in the luminous bulb.

20. The discharge lamp of claim 17, wherein

5           the discharge lamp is a mercury lamp in which a bulb  
wall load of the luminous bulb is 80W/cm<sup>2</sup> or more.

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